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CONCERNING THE CONCEPT AND EXISTENCE—PROOFS OF THE INFINITE.

PROBABLY no other single term has played so grave a rôle in the thought of the world as the term Infinity or its verbal equivalents. Long before the days of Protagoras man believed himself to be somehow the measure of all things. And this faith, as if rooted in the very core of his being, as if an essential element of the ultimate definition of man, as if an absolute invariant under all transformation of the germ plasm itself whence he springs and derives his continuity, has survived every vicissitude of human fortune, marking and sustaining metaphysical speculation in every time and place. Actual knowledge is one thing, always imperfect and incomplete; but the spirit of knowledge is quite another, always insatiable and intolerant of limitations. Unlike experience and observation, curiosity has known no bounds; and questions about the infinite, already prominent in the childhood of thought, back yonder figuring conspicuously amid the primal rudiments of philosophy, have rather gained than lost in interest with the lapse of time and have not ceased to be in one form or another among the most fascinating that have engaged the human mind. Often these have been questions primarily of theology or of metaphysics, but not invariably so. For man can not live by these interests alone. He has had to measure and to count, and this homely necessity, fruitful mother of difficulty and doubt, independently set the complementary problems of the indefinitely small and the indefinitely large; and thus needs quite as stern and immediate as those of philosophy and religion, I mean the exigencies of science and especially of mathematics, demanded, in the very beginnings of exact knowledge, that the understanding transcend every possible sequence of observations, pass the uttermost limits of 'experience,' which, however refined or enlarged, remains always finite, and actually lay hold upon infinity itself. To this ancient, irrevocable demand thus urged upon the reason from every cardinal point of human interest, genius has responded as to a challenge from the gods, and I submit that the

response, the attempt of man to subjugate extra-finite being and bring it under the yoke of knowledge, has been the most sublime and strenuous and inspiring enterprise of the creative intellect of every age.

What of it? These centuries of gigantic striving, these ages of philosophic toil, this immeasurable devotion of energy and time and genius to a single purpose, the intellectual conquest of infinity—what has it all availed? Has any real advance been made? I speak of the conquest. I do not ask whether it has been accomplished. That might seem a trifle premature. I inquire whether, strictly speaking, it has been begun. Let not the import of the query be mistaken. Every one knows that seeking has compensations of its own and that these are oftentimes better than any which finding itself can give. So, conceivably, it might be with this problem of the infinite. It may be granted that, even supposing a solution to be unattainable, the ceaseless search for one, the unwearied high endeavor of the reason throughout the ages, presents a spectacle of which mankind, it may be, could ill afford to be deprived. It may be granted that incidentally many fine insights have been gained, which, though not solutions, have nevertheless permanently enriched the literature of the world and are destined to ennoble its life. It may be granted that in every time some doctrine of infinity, some philosophy of it, however imperfect, has been at least effective, has helped, that is, for better or worse, to fashion the forms of human institutions and to determine the course of history. Concerning none of these things is there here any question. As to what the question is there need not be the slightest misapprehension. The fact is that for thousands of years philosophy has recognized the presence of a perfectly definite problem, the most august of all her problems, namely, that of extending the dominion of logic, the reign of exact thought, out beyond every range of finite things into and over the domain of the infinite, and for thousands of years she has constantly striven to solve the problem. And now I ask—not, has it been worth while? for that is conceded—but has she advanced the *solution* in any measure, and, if so, in what respect and to what extent?

The answer, fortunately, is to be as unmistakable as the question. It must be understood, of course, that the 'problem' as stated is exceedingly, almost frightfully, generic, embracing a host of interdependent problems. Of all these, one is preeminent. Without its solution, no other *can* be solved; with its solution, any other *may* be eventually. That problem is the problem of definition, of discovering a certain principle, a principle of division, namely, that which separates the universe of things into its two most fundamental, mutually exclusive and, taken together, all-inclusive classes, the finite

and the infinite. It is, then, a problem of reciprocal delimitation, of telling precisely and finally what for thought the infinite is and what for thought the finite is.

Thanks to the subtle genius of the modern Teutonic mind, this problem has been at length completely solved, and our original question is answered: *the conquest has begun.* Four men,[1] Bernard Bolzano, Bernhard Riemann, Richard Dedekind and George Cantor, one of them an acute and learned theologian and philosopher with deep mathematical insight, the others profound mathematicians with a strong bent for metaphysics, quite independently and about the same time found substantially one and the same solution. And thus it is a distinction of our own time that within the memory of living men the characteristic mark of the infinite first failed to elude the grasp, and that the august term, after the most marvelous career of any in the history of speculation, has at last assumed the prosaic form of a perfectly precise and completely determined concept, and so been made available for the purposes of rigorously logical discourse. And, now, what is this concept? From among a variety of equivalent forms of statement, we choose the following: *A class (group, collection, assemblage, manifold) of things (elements) is infinite or finite according as it contains or does not contain a part to which the whole is equivalent in the sense that between the elements of the part and those of the whole there subsists a unique and reciprocal, or one-to-one, correspondence.*

The formation of this concept is to be regarded, I believe, one of the greatest achievements of thought; great as being in a sense the culmination of many centuries of arduous speculation; great as affording the means of meeting the necessity it has created for a reexamination and a juster evaluation of historic philosophies of the infinite; and greater still, I think, as containing the promise of future conquests in that realm transfinite whose boundary and character the concept itself defines. But is this judgment not extravagant? For the concept is so simple, so apparently independent of any elaborate system of subtile presuppositions, that one can not but wonder why it was not formed long ago. Frankly, there seems to be no very obvious reason why it should not have been, by some Greek, for example, or an acute scholastic. It must be confessed that no divinity has seemed to shape the course of research. Cer-

[1]Bolzano: 'Paradoxien des Unendlichen.' Riemann: 'On the Hypotheses which Lie at the Basis of Geometry.' Dedekind: 'Was Sind und Was Sollen die Zahlen,' also in English. Cantor's papers in Volume II. of *Acta Mathematica*, and elsewhere. Riemann, I should note, is here cited because he was first to point out the distinction between boundless and infinite manifolds. Bolzano, too, indicated the distinction between these adjectives, but seems not to have perceived its significance for geometry.

tainly there is no flaming evidence of a predetermined rational order in the development of curiosity. On the contrary, in the evolution of thought, as in that of the material universe, there appear to be vestiges of chance, and seeming waste meets the gaze at every turn. What of it? Had the concept in question been early formed, the history of thought had doubtless been different. But it was not then formed. Now that we have it, it is found to be simple, very simple, hardly more complicated than the Newtonian law of gravitation, scarcely more difficult to understand than the geometric depiction of the complex variable, almost as easy to grasp as the notion of the conservation of energy, or a hundred other central concepts of science. That is very shallow criticism, indeed, and foolish, that values ideas according to their complexity and identifies the simple with the trivial.

Any adequate account of the purely mathematical bearings of the concept in question would be a long story, and, even were it otherwise, should not be here attempted. For that the best recourse is to the cited works of the masters. My present concern is less remote. I propose to deal briefly with certain questions involved in recent discussions of the logical bearings and philosophic import of the idea. Among these discussions may be mentioned as most notable the beautiful essay, 'De l'Infini Mathématique,' by M. Couturat, the imposing treatise on 'The Principles of Mathematics,' by Bertrand Russell, and especially, because of their luminous character and rich suggestiveness, two essays by Professor Royce appearing respectively in volume I. of 'The World and the Individual' and in the October number of the *Hibbert Journal of* 1903. The work of the Frenchman has been extensively reviewed by Jules Tannery in volume VIII. of the *Revue Générale des Sciences.* I shall, therefore, confine my remarks to the mentioned discussions by the Englishman and the American. I take pleasure in confessing admiration for the masterful ingenuity of the discussions and in bearing witness to their *general* soundness. Nevertheless, despite the last-named quality, they appear to me to contain some more or less serious errors, one of them especially of the most radical nature, which, unless soon arrested in their course, are likely, particularly through the agency of Professor Royce's fascinating papers, to gain a wide and lasting currency.

These errors, arranged in the ascending order of their importance, relate (1) to the so-called *positive* quality of the Dedekind-Cantor definition of the infinite; (2) to the alleged implicit denial, in the definition, of the axiom of whole and part; and (3) to the alleged possibility of proving, by aid of the concept, the existence of the infinite.

We will examine these in order. Independently of Dedekind and Cantor, Bolzano defined finite and infinite substantially as follows: Suppose given a class *C* of elements. Out of these suppose a series formed by taking for first term one of the elements, for second term two of them, and so on. Any term so obtained is itself a class of elements, and is *defined* as finite. Now either the process in question will exhaust *C* or it will not. If it will, *C* is itself demonstrably finite; if it will not, *C* is *defined* to be infinite. Now, say Professor Royce and others, such definitions, thus depending respectively on the notions of exhaustibility and inexhaustibility, are respectively positive and negative. Bolzano affirmed and exemplified, though he did not demonstrate, the proposition that any class, if infinite according to his definition of the term, enjoys the property of being equivalent, in the sense above explained, to some proper part of itself. Now it can be, and, indeed, repeatedly has been, proved that every class that is infinite in Bolzano's sense, and no other class, possesses the property in question; accordingly this property might be taken as a basis of a definition of the infinite. Precisely this was done by Dedekind and Cantor, with the result that as a class is infinite or finite according as it has or has *not* a certain property, it is now, according to Professor Royce, the infinite which is positive and the finite which is negative. Really, it appears to me, this comes perilously near to juggling with words. For what is positive and what negative? Are we to understand that these have absolute as distinguished from relative meaning? I am reminded of Lotze's observation to the effect that an idea, once in the mind, is really *there,* at least there *then*—something *positive,* you see—and accordingly that the real problem of memory is not how we recollect, but how we forget. Perhaps the distinction has merit. If so, then I suppose we must allow that, a process being once started, its *continuation* is positive, its termination negative, in which case *not* to end would be positive and to end negative, and so it would turn out to be Bolzano's definition which is positive and that by Dedekind negative. Such simple dialectic, I do not for an instant imagine, can be in the slightest degree edifying to so acute a logician as Professor Royce. I have dwelt upon it in order to guard against the impression which his paper in the *Hibbert Journal* seems likely to give that in the author's judgment the value of Dedekind's definition, of which so much is there made and, for the most part, justly, too, somehow consists largely in its alleged positive quality. In and of itself the distinction of positive and negative is here of no importance. What is important is that, either of the definitions being adopted, the other states a derivable property of the thing defined. I am far from intending to say that, because the definitions are logically equivalent,

they must needs be or, indeed, are so practically, that is, for use in investigation. That is another matter, to be tested by trial, and, in this matter, I heartily concur with Professor Royce's preference.

I turn now to the assertion by Professor Royce and Mr. Russell that the Dedekind-Cantor definition of the infinite, of which the above italicized statement is the exact equivalent, in fact denies the axiom of the whole and part. It is, in the first place, to be observed that the statement itself avoids the expression *equality* of whole and part, and employs the term equivalence. As I remember it, the word employed by Dedekind himself is *ähnlichkeit*. But, says Professor Royce, that is what the axiom means by equality. Now it is just this statement which I venture to draw in question. Says Professor Royce, if we know that each soldier of a company marching along the street has one and but one gun on his shoulder, then even if we do not know *how many* soldiers or guns there are, we do know that there are precisely '*as many*' soldiers as guns. Now what the definition in question, taken severely, affirms, in this case, is that the assemblage of guns is 'equivalent or similar' to that of the soldiers. Note that we are speaking here of multitudes as distinguished from continua, a restriction which Professor Royce will allow, as he has adopted it in his own discussion now under review. If now in place of soldiers we write, for example, all positive integers, and in place of guns, all even positive integers, then the definition again asserts, as before, equivalence of these assemblages. Thus far nothing has been said about *number* as an expression of how many. *If* now there *be* a number that tells how many things there are in one assemblage, that same number tells how many are in any equivalent assemblage, and just because the number, *if there be one*, is the same for both, the two are said to be equal by axiom. But common sense, whose axiom is here in court, has neither found nor affirmed the existence of a number telling, for example, how many integers there are. It thus appears that the axiom supposed, regarded by common sense if you will, however unconsciously but nevertheless in intention, as applicable *only in case there be a number telling how many*, is in all strictness not denied by the definition in question. Numbers designed to tell how many elements compose an assemblage that is equivalent to a part of itself are of recent invention. These being once invented, it becomes a question, to be decided not under the spur of logical compulsion, but on grounds of pure *expedience*, whether equivalence shall be translated into equality. If the decision be, as seems expedient, favorable to such translation, then the old axiom of whole and part, if viewed as above, still remains uncontradicted, is still valid precisely wherein it pretended to be valid; it is merely that a new number-domain has been adjoined in which

the old axiom does not apply and never essentially pretended to, and on account of which, for the sake of good neighborship, it is compelled, not indeed to retract its ancient claims, but merely to assert them more cautiously and diplomatically.

There remains but little space to consider the third question, a question of the most fundamental importance, namely, whether it is possible to prove that there are infinite systems. That such proof is possible is affirmed by Bolzano, by Dedekind, by Professor Royce and by Mr. Russell. Not to delay the issue, I may say at once, as I have elsewhere pointed out,[2] not only that the arguments adduced by them are vitiated by circularity, but that this is bound to be the case with every such attempted demonstration. In support of my first contention, it will suffice to examine one or two specimens of the alleged demonstrations, all of them being variants under a single type. To verify my representations it will, of course, be necessary for the reader to compare them with the authors' own statements, which can be readily found in their above-mentioned works.

Bolzano undertakes to prove, among other like statements, the proposition that *die Menge der Sätze und Wahrheiten an sich* is infinite, this latter term being understood, of course, in accordance with his own definition above given. The attempt informally postulates: the proposition, such truths exist, is such a truth, A; A is true, is another such truth, B; so on; and, the indicated process is inexhaustible. Doubtless these postulates are all of them true, but the last is so evident a *petitio principii* as scarcely to deceive even a freshman.

In case of Dedekind's demonstration, of which Professor Royce has repeatedly expressed his admiration, as any one may well do, for the argument is exceedingly ingenious, the *versteckter Zirkel* lies much more deeply inwrapped, owing to the so-called positive form of Dedekind's concept of the infinite. On examination the proof is seen to postulate as *certainties:* (1) if there be a t (symbol for thought), there is a t' (call it image of t) having t as object; (2) if there be two distinct t's, the corresponding t''s are distinct; (3) there is a t; (4) there is a t which is not a t'; (5) every t is other than its t'. These being granted, it is easy to see, by supposing each t to be paired with its t', as object with image, that the assemblage θ of all the t's and the assemblage θ' of all t''s are equivalent. But by (4) there is a t not in θ', which latter is, therefore, a part of θ. Hence θ is infinite, by definition. Now let this matter be carefully scrutinized. Assuming only these postulates and, of course, the possibility of reasoning, it is obvious that by pairing the t of (4) with its image t',

[2] 'Concerning the Axiom of Infinity and Mathematical Induction,' *Bulletin of the American Mathematical Society*, May, 1903, Vol. IX.

then the latter with *its* t', and so on, a sequence S of t's is started which by (1) and (5) can not terminate. This S, too, by Dedekind's proof, is an infinite assemblage. Accordingly, *postulate* (1), *without which the proof is impossible, postulates in advance of the argument, certainty which, if the argument's conclusion be true, transcends the finite before the inference that an infinite exists is drawn.* And this disclosure of the circle in Dedekind's movement, and that of Russell's is just as beautiful, at the same time illustrates the truth of my second contention, which is that all *logical discourse of necessity presupposes certainty that transcends the finite.* Space fails me to exhibit this fact duly—I say exhibit, not prove, for to say the latter would be tantamount to assuming the possibility of a deductive argument A in order to prove that the conclusion of A can not be drawn unless it is assumed in advance. The fact, then, if it be a fact, and of that I have not the slightest doubt, is to be added to that group of fundamental simplicities which can at best be *seen*, if the eye be fit. For the present a single other exhibition of the fact must suffice. Consider the form: every a is a b; every b is a c; $\therefore$ every a is a c. I merely point out here that the apodictic *feeling*, which is the only and an absolute justification, without appeal, of the inference as such, is in no slightest degree *contingent* upon any question as to whether the assemblage of a's is or is not equivalent to some one of its parts. The feeling of validity here transcends the finite.

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ORGANIC IMAGES.

I WISH, in this note, to enter a plea for a more systematic study than has yet been made of the images of organic sensations and their complexes. It seems to have been taken pretty much for granted that the human mind is capable of images of *all* sensations.[1] Sully says outright that 'revival under the form of an image holds good of all classes of percepts or sense-impressions.[2] Ladd, whom I understand to deny the specificity of organic sensations other than the kinæsthetic,[3] appears to agree.[4] James does not raise the ques-

[1] I write this note in some haste, and without an adequate review of the literature. This sentence may, therefore, be exaggerated; but it conveys my impression.

[2] 'Human Mind,' II., 1892, 281.

[3] 'Psychology, Descriptive and Explanatory,' 1894, 118 f.

[4] *Ibid.*, 234 f., 244.

tion. He begins his chapter on Imagination with the words: 'Sensations, once experienced, modify the nervous organism, so that copies of them arise again in the mind after the original outward stimulus is gone,' and his discussion does not take us farther into the body than the voluntary muscles.[1] In writing on emotion, however, he uses the phrase 'either the vivid feeling of the manifestations, or the idea of them': a phrase that seems to point towards an imaging or ideation in kind of the bodily 'expression' of emotion.[2] Lay asserts that 'we have mental imagery from all the senses; that is, some of us are conscious of it'; and his list of types includes images of pain, organic and emotive images.[3] Stetson remarks that 'perhaps in early child life, all sense presentations are remembered equally well,' but that later on attention is predominantly directed upon visual memory. 'There is no doubt,' he goes on, 'that attention to a single sense tends to develop memory images of that sort.'[4] The presumption that all sensations *can* be imaged appears to run through the general questionaries, from Galton down.

I have lately been led to take a somewhat different view of the scope of mental imagery. My present belief, acquired inductively, may most easily be put in teleological form, as follows. I think that we have free images in the higher sense departments, where such images are needed. We must have images of sight and hearing, if conversation and the various other forms of intercourse are to go on.[5] The stimuli act 'from a distance,' and are at any given time present only in small part. Images are therefore essential, as filling out the gaps in actual stimulation. Contrariwise, images are not needed at the lower end of the scale, for the organic sensations *sensu stricto*. We have our own bodies always with us; and the organic sensations will, consequently, be renewed or revived or reestablished when necessity arises; there is no biological sanction for the existence of images of these sensations. One might, therefore, expect to find a great variety of free imagery, say, in vision; and no free imagery at all, say, for hunger and thirst. Between these extremes, one would expect to find all sorts of intermediate stages. There may be sensations whose images can be evoked separately and voluntarily, like the images of visual sensations; there may be

[1] 'Principles,' II., 1890, 44.

[2] *Ibid.*, 458.

[3] *Psych. Rev. Mon. Suppl.*, VII., 1898, 4.

[4] *Psych. Rev.*, III., 1896, 409 f.

[5] Even here, it is not safe to generalize too hastily. 'Nobody except the born blind and deaf,' says Lay (*op. cit.*, 4), 'would deny the existence of visual and auditory mental imagery.' French, however, declares that he has 'never been able to discover any distinct and separate auditory images' (*Psych. Rev.*, IX., 1902, 51). The point is not important for my present argument.

others whose images appear separately, but only involuntarily. There may be sensations or sense complexes which occur, voluntarily or involuntarily, not in separation but merely in total situations. Thus the choking or strangling which is characteristic of certain forms of anger might be incapable of separate recall in kind, but might be imaged along with the other sense components of the emotion when anger is recalled as a total experience. It seems to me to be important that these distinctions, and others like them, should be borne in mind, in the study of imagery; in other words, that the study should be systematised. It seems to me, too, to be extremely important that the image should be differentiated from the renewal or reestablishment or reinstatement of a sensation. Certain writers upon the subject—not all!—actually take the renewal or revival of peripheral sensations as evidence of the existence of imagery in the particular sense department. They take, *e. g.*, the 'lip feeling' of the word 'bubble' as evidence of motor imagery. But the lip feeling is, of course, a present sensation; not the image of a sensation. The lip feeling and the image of the lip feeling are as different as the sight of a red square and the image of a red square. They can be introspectively distinguished; they belong to different mental categories. If the lip feeling occurs as such, the chances are that the image of it does not occur.

I have not doubt, in my own case, of the existence of visual and auditory images,—free images, capable of separate voluntary arousal. I have no doubt, from the reports of others, of the existence of free kinæsthetic images, verbal or other. From my own introspection, I find it extremely difficult to say whether I have these images or not. I can very easily reestablish, in present sense experience, a kinæsthetic complex; the least cue of present 'muscular sensation' brings up the whole. But I doubt whether I have free kinæsthetic images; whether there is not a faint but real renewal of the sensations in all my kinesthetic 'memory.' In the sphere of cutaneous sensations, I can imagine pressures, and, I think, warmths; I do not think that I image colds. Taste images, if I have them at all, are extremely rare. Smell images seem to occur only sporadically and involuntarily. I notice with smells, however, something of what I have just mentioned with regard to kinæsthetic complexes. The least hint of a real smell may be amplified and changed by attention into almost anything I like. I can smell out, from the scent of a good cigar, a large number of flower perfumes: I seem to myself really to imagine these perfumes. If, on the other hand, I try without any olfactory cue to recall the smell of violets, I get to the verge of the smell image, tingle with the expectation of it; but I do not attain it. The organic sensations proper I can readily reestab-

lish, and almost as readily inhibit. When, however, I try to secure their images, I am almost invariably balked. Pain, though I have had a large and varied experience of it, I can not image. If I think of stubbing my toe, I get either a picture of the event or a real sympathetic shrinking and quivering, that makes me move my toe uneasily. If I think of the pain of a particular tooth, some tooth-pain that I know very well, I have either a verbal description or an actual thrill in the tooth: I can find no pain-image. Neither, so far as my present introspection goes, have I any image of yawning, hunger, thirst, lust, tickling, nausea, dizziness, choking, stuffiness, 'sinking of the stomach,' and a number of other complexes that I am familiar with but have no name for. These things come to me either in surrogate images or as actual experiences.

It is notoriously unsafe, in this field, to generalise from one's own experience. And I am aware that there are marked individual differences as regards the lower forms of sensory images. I have found persons, trained in introspection, who assured me that they had, on occasion, flashing cold images, lust images, dizziness images. On the other hand, I have never found a competent observer who affirmed the existence of images of hunger and thirst. I believe, too, that organic images are always rather the exception than the rule; and I believe that no single mind has any large variety of them. There is a great discrepancy between my introspections and those of other trained observers (Lay, *e. g.*, finds only 1.1 per cent. of organic imagery in his own case), on the one hand, and the mass-results of questionaries, on the other. Thus, of 116 Vassar students examined by French, 80 (or 69 per cent.) 'report that they can call up organic sensations in general, though many of them are unable to recall some of those suggested. Several note that they can not recall any image of organic sensation unless at the time they are inclined to have that sensation.'[1] A statement of this kind is, I take it, practically worthless. The second sentence shows some power of introspection; but the 'several' students have evidently confused the renewal or reestablishment of an organic sensation with the appearance of its image. We have no warrant whatever for supposing that the remainder had advanced even thus far in introspection. It may quite well be the case that one and all of them have confused the weak or partial reinstatement of a certain sensation or sense complex with the occurrence of an organic image. The question asked is a question of very considerable introspective difficulty, and can not be settled by so rough a method. I regard this and similar statements in the literature as distinctly misleading; and it is largely for this reason that I venture to plead for more

[1] *Psych. Rev.*, IX., 46, 54.

refined and systematic work. I should like to know precisely what organic sensations can be imaged; whether those that can be imaged are recalled alone or only in total contexts; whether they can be recalled at will, or occur only 'of themselves,' involuntarily; whether and to what extent their images enter into the ordinary texture of consciousness in minds of a certain constitution; whether we all have the *Anlage* for organic imagery, and can evoke it by practice and attention; and so on. To problems of this kind the questionary method, as ordinarily applied, is not adequate.

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CASES OF DOUBLE CONSCIOUSNESS.

THE phenomenon of double consciousness is presented so rarely to the physician that every case offers certain points of interest. The two following cases have come under my observation within the past year:

CASE I. A healthy young man, a football player on one of the university teams, while playing a college match was thrown heavily and for a few moments lay unconscious on the field. Within two minutes, however, he got up and went on playing and during six minutes following he played well, he answered signals of the captain in a proper manner, although several of these signals involved complicated movements, and he appeared to be in a normal state. He then suddenly became conscious that he was in a very nervous, trembling condition, and unable to play, and was led off the field in a state of great nervous excitability, and for several hours was prostrated.

When he came to himself, he had a recollection of the fall but he had no recollection whatever of the plays in which he had participated after the fall and which he had carried out with apparent consciousness and perfect accuracy. At the present time his memory extends up to the time of the fall and begins at the point where he felt the tremor and prostration, but he has absolutely no recollection of the six minutes subsequent to the fall during which, as already stated, he played a good game.

CASE II. A man twenty-four years of age, who had been for three months in a state of great mental anxiety, during which time he was decidedly overworked, suffered from an attack of the grip in March, 1903. On the 24th of March, just as he was recovering from this attack, he went to his office as usual in the morning and about noon left the office to do an errand. He remembers going out and crossing Broadway and having to jump suddenly out of the way of a car, the motorman shouting

'jump' as he did so. From this time for the subsequent week he has no recollection whatever of his actions and during this time he was lost to his family, who were correspondingly alarmed at his absence and took measures through the police to try and trace him. These measures, however, were futile and no trace was found of him until March 31, when a friend met him wandering about in Harlem and recognized him and took him home. On arriving at home he recognized his friends, complained of intense headache, seemed much depressed and very nervous, and said that he had recovered his memory at about ten o'clock in the morning, when he found himself on the elevated railroad between 104th and 116th Streets, much to his own surprise. He got off at his regular station, 125th Street, but did not appear to recognize the streets and was much relieved when his friend appeared and guided him to his house. He remained in his house for the following few days suffering much from headache, but gradually recovered, and when I saw him on the 9th of April was in his ordinary health. He had apparently no recollection whatever of any events between the 24th of March and the 31st of March.

On his return he presented a somewhat dishevelled appearance and was without money and had apparently had nothing to eat on that day, as he was quite famished.

On cross-questioning, it was found that he had a dim recollection as of a dream of having gone to a hotel down-town for the night and of having come once to Harlem with a view of finding his home, but being unable to do so. Subsequent investigation proved that he had been one night at this hotel, as he was registered there in his own name. He was seen once during the week by a policeman whom he knows down-town, but this man, though knowing of the alarm that had been sent out, did not think it worth while to speak to him or take him home, but told him of the fact later on when he was regularly attending to his business. What his movements were during this period of six days he has not been able to ascertain. He did not go to his office and he did not come to his house.

He was a man of good habits. There is no suspicion that he was making this an excuse for having gone on a spree, and nothing in his history points to any reason for such a sudden disappearance. He has been well ever since.

It seems probable that the sudden shock or fright of the danger of being run over by a car threw him into a state of second consciousness, from which he emerged spontaneously at the end of a week.

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DISCUSSION.

THE LOGIC OF HISTORY.

THE most important criticism evoked by Professor Rickert's book, 'Die Grenzen der naturwissenschaftlichen Begriffsbildung,' is an article by Ferdinand Tönnies in the *Archiv für systematische Philosophie,*[1] in which he takes exception to the identification of natural science with conceptual science. Rickert, in his book, draws a sharp distinction between *Begriffswissenschaften, i. e.,* sciences whose end is the discovery of *universals* or general laws, and sciences of the *individual* whose end is the description and interpretation of single and unique facts and processes. The latter alone are sciences of the real, since the reality is everywhere the individual (this is the same distinction as that made by Windelband under the names *nomothetic* and *ideographic sciences*).

Tönnies objects that it is an unwarranted limitation of the scope of sciences which deal with universals, to identify them solely with the natural sciences. This, he thinks, would shut history out of the category of science altogether. He says that Rickert seems concerned, above all things, to show that the *matter* of history excludes its treatment by the methods of natural science, and this is the ground of Rickert's denial of the value of psychology to the historian. Psychology deals with the *general* nature of mental processes. It can not explain the individual. And what the historian needs is insight into the unique processes of individual minds—a kind of divinatory intuition of the individual. To this insight psychology will not help him. Tönnies replies that great historians actually do make use of the psychological theories of their own times, and that the imperfection of psychology is no argument against its value as a science auxiliary to history. As well object to the application of plant physiology in botany because the known laws of physiology do not suffice to explain every accidental variation of plant-life.

Tönnies holds that, besides the merely descriptive histories (chronicles, local histories, etc.), there is room for a more strictly scientific treatment of history in which the laws of historical development are traced and in which the individual is treated merely as the example of a law or universal principle. And this, of course, is the highest form of historical science. Tönnies says that the truth on which Rickert's greatly overdone antithesis between the two types of science is built up is simply the distinction between

[1] 'Zur Theorie der Geschichte,' Band VIII., pp. 1–38. Rickert replied in the same volume, pp. 137–163, under the title, 'Ueber die Aufgaben einer Logik der Geschichte.'

pure science, which always deals in universals, and *applied science, i. e.,* the application of the universals of science to the actual world. Out of this simple distinction between pure theory and mere fact Rickert evolves a whole logic and theory of knowledge.

Rickert holds that history in its treatment of its individual and non-repeatable (*einmalig*) data selects and arranges its material under the guidance of *culture-values,* and that these are the sole objective and universal principles employed in history. Tönnies holds that there are other universal principles applicable to historical processes, *e. g.,* the law that the individual will is controlled by the social will, the influence of the *general movements, tendencies* and *prevailing ideas* of a period on its individual leaders, etc. These principles constitute the elements of a general social theory applicable to all history. Tönnies concludes that Rickert's rigid separation of conceptual (or natural) and historical sciences is unwarranted.

In general reply to this criticism Rickert states that Tönnies and others have failed to understand his book, primarily because they have not grasped the problems of a logic of history, and he addresses himself to the statement of these problems. There are two principal problems: (1) What *value* as objective knowledge have the forms of thought used in this particular field? (2) What *ends* are *actually* sought by the science in question? The first problem belongs to the *criticism of knowledge,* the second to *methodology.* The latter question must be answered before the former can be considered at all.

Rickert points out that he does not deny the presence of historical elements in natural science, nor the application of conceptual universals in history. But the science of knowledge must consider distinctive *methods* in their purity and isolation. And the problem is not principally a question of difference in materials, but in *ends.* The *end* of *natural science* is to subsume the individual under the universal, to reduce fact to law. *The end of history is to understand and interpret reality in its singularity and individuality.* In both natural science and history a given material may be treated from the standpoint of evolution. But in natural science, *e. g.,* in embryology, the particular case is treated simply as the exemplification of a general law, whereas in history, the science of the development of human *culture,* each period, phase and personality has a unique and individual reality and significance. The term 'historical' should always refer to an individual and unique (*einmalig*) process or event. A *historical* religion, *e. g.,* is a singular and once-occurring religion in contrast to *natural* religion, which is assumed to be grounded in universal human nature. The contrast between the natural and the historical sciences is not, then, primarily one of

material, but of *method.* We might treat the development of the earth as a unique historical process. 'The logical opposition of method shows itself not in the material, but in the concepts employed,' and these, in turn, depend on the ends sought.

The social life of man may properly be treated with explicit regard to the universal. The particular fact may be brought under a system of laws. This is the procedure of sociology which is, like psychology, a natural science. The individual is treated solely as the exemplification of a general law. But the unique and once-occurring development of human culture can not be so treated. Hence when sociology attempts to be, as with Comte, a philosophy of history it becomes a 'logisches Unding.' The real historical connection (*Zusammenhang*) is always an *individual* process consisting of individual parts which are elements in an individual whole having culture-value. These wholes are historical groups (*e. g.,* the Italian humanists, etc.). Concepts may be formed of their common features. But these concepts are subordinate to the understanding of the group as a unique fact. The very fact that we *evaluate* historical events and processes points, of course, to an over-individual and objective system of values. But these have nothing to do with the abstract conceptual universals of natural science.

The naturalist, such as Tönnies, hypostatizes abstract laws and sets up a metaphysical realism of concepts. A theory of science (*Wissenschaftslehre*), free from metaphysical assumptions, holds that the real is always individual and that general 'movements,' historical 'tendencies,' etc., are real only in so far as they are constituted by individuals. A law or universal is a *means of cognition,* a *form* of *thought,* not an object of knowledge. And we must distinguish carefully between the general concept in natural science, for which the individual is a mere example, and the historical group concept which represents a single whole of related individuals.

This whole discussion serves to define more clearly the issue on a question that has not yet received the attention it merits at the hands of English and American students of philosophy. On the one hand, it is proposed to treat history scientifically by methods analogous to those of the natural sciences. Tönnies is essentially a naturalist. For him the ideal of all science is the reduction of the individual to the mere example of a universal or law. Behind this methodological attitude lurks a metaphysical theory, viz., the superior reality of the universal, the ultimateness of scientific law. Rickert, on the other hand, insists that historical science has aims and methods peculiar to itself. Behind his acute exposition lurks also, in spite of his disclaimer, a *metaphysical* assumption, viz., *the real is the individual.* And so Rickert emphasizes the uniqueness

of the cultural development of man as well as of every single historical process, and he views knowledge teleologically. This discussion in methodology brings us back to a fundamental problem of metaphysics—the relation of the individual and the universal. Rickert seems, on the whole, to be right in his account of the contrast in method betwen the natural sciences and the historical or humanistic sciences. But he does nothing to solve the dualism in our knowledge which this contrast creates. It may be true that the real is always individual. If so, we need to know what is the function and what constitutes the validity of the universals of science in relation to reality. Merely to make good the assertion that the real is the individual, one must give a clearer answer to this question than Rickert has done. On the other hand, there seems good ground for holding that there are conceptual universals or laws, valid for the social-historical world, although they are more remote and less easily discovered than in natural science. What is the significance of these universals in relation to the so-called general culture-values and to the individual real? Rickert has raised metaphysical problems which can not be laid simply by calling his opponents 'conceptual realists.' The unity of knowledge is a postulate of philosophical thinking, and this unity is left in question by the sharp antithesis of the natural and the historical sciences.

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THE LIMITATIONS OF MINOR LOGIC.

IN the last number of this journal, Mrs. Franklin says: "A recent writer in *Science* slips into a curious error in phraseology. He allows himself to speak of a 'superabundance of physicians going hand in hand with a shortage of patients' as being attributed to, etc. But the superabundance of physicians is the same thing as the shortage of patients," etc. The editor of a journal disclaims responsibility for the opinions and doubtless also for the logic of its contributors. But in this case the responsibility appears to be thrown on the journal rather than on the contributor, who is not mentioned. We are all ready to confess that we are miserable sinners, but usually object to the imputation of any particular sin. I venture to suggest that Mrs. Franklin's comments illustrate the limitations of minor logic rather than a lapse in logic on the part of the writer. He was discussing the statistics of medical students, and the conclusion of his sentence (omitted by Mrs. Franklin) was 'must be attributed to a decrease in the number of illnesses, a decrease due to the application of modern methods of preventive

medicine.' The writer of course means that there has been an increase in the number of physicians as compared with the total population, and that at the same time the number of illnesses, as compared with the total population, has decreased, largely owing to the increased number of physicians. These statements are by no means the same. It would scarcely be worth the while to make this explanation if it were not that it illustrates the fact that formal logic tends to ignore the complexity of thought—hence its comparative barrenness.

EDITOR OF SCIENCE.

REVIEWS AND ABSTRACTS OF LITERATURE.

The Nature of Goodness. GEORGE H. PALMER. Houghton, Mifflin & Co. 1903.

That a need exists for a good text-book in ethics has long been evident from the succession of introductions which have appeared of late years. Mackenzie's 'Manual' and Muirhead's 'Elements' have held their own pretty well, yet have not been felt to satisfy the need completely. Nor has Seth's 'Principles,' though marking an advance, quite realized the ideal. The Hegelian spirit seems to manifest itself in a tendency to over subtlety and refinement in details which is confusing to a beginner, and at the same time to a vagueness in the statement of first principles which often produces in the reader a sense of mystery and elevation, but by no means conduces to clearness of comprehension. The student is not impressed with the reality of the analysis—the principles discovered seem to be those of an experience other than his own—the whole discussion seems remote from life, and he retains a vague feeling that his study has not answered his legitimate expectations.

Apparently with a desire to meet these objections we have had two more recent works, one professedly an introduction, the other a more comprehensive treatise, those of Fite and Mezes. The latter of these, in its preliminary discussions of the nature of ethics and the characteristics of moral experience, is refreshingly real and concrete. One feels that he is face to face with life and engaged with its analysis. Yet the book as a whole lacks that unity of principle and treatment necessary to make it intelligible to a beginner. The materials are good but they appear to have mastered the builder. Dr. Fite's 'Study' makes interesting reading for the initiated or for those philosophically inclined and looking for a theory of the world as a whole, but for the uninitiated ethical student it is impossible. The work is not an introductory study of ethics, but an elaborate and interesting criticism of certain typical philosophic theories, with special reference to their social and moral significance. It is an introduction to theories rather than to the facts of the moral life.

If ethics is to maintain its self-respect in these days of the exact sciences it must adopt something of their method. It must cease to be merely a struggle of contending theories and become a direct study of moral experience. The student should not be first bewildered and unsettled by a discussion of rival theories and only after having gained a vivid impression of the uncertainty of all things ethical, be finally made doubtfully happy by a neat reconciliation of the rivals and an assurance of their future harmony. His conclusion is apt to be that the whole matter is an artificial solution of an equally artificial puzzle. His first introduction should be to actual moral judgments—to those fundamental distinctions of right and wrong in conduct about which there is no dispute—and his further progress should be in the analysis of the necessary implications of those judgments until he is finally led to the discovery of the most fundamental principles as involved in his simplest judgments. There will be more or less difficulty in the exact formulation of these principles, but at least the student will feel that they have as firm a ground in experience as have the principles of knowledge. He will not lay down his book or leave his class-room with the belief that moral distinctions are speculative and uncertain while those of economics or psychology are certain and real.

When Professor Palmer published his series of popular lectures on the 'Field of Ethics' a short time ago, it was the hope of all admirers of his genius for lucid and well-balanced exposition that, now that he had broken silence on the subject of ethics, he would follow it up with a similar work presenting his own solution of the problems of that science. This he has now done in his 'Nature of Goodness,' in the preface to which he expresses the hope that the two volumes may together serve as an introduction to ethics. Of the earlier book it is not necessary now to speak at length. It was recognized at once as characterized by that simplicity and directness of statement which comes only from perfect mastery of a subject. In fact, its chief drawback as a text-book was perhaps the completeness of the exposition.

The present volume is an illustration of the same power in the author. It proposes to solve the first problem of ethics, that of the nature of goodness. A masterly analysis of the uses of the term brings out the twofold aspect of goodness, extrinsic, as means to an end beyond itself, and intrinsic, as an end in itself, and also the essential unity of these aspects, no object having value as means save as in itself good, and none having worth in itself save as also related to others, the general conception of goodness being thus that of organic wholeness or fulness of organization. Personal goodness, with which ethics is concerned, is the organic wholeness of those beings we call persons. The characteristics of persons are self-consciousness, self-direction, self-development and self-sacrifice. The goodness of persons consists in the realization of selves through conscious direction, development and sacrifice, in the attainment of the most complete life through the service of society. The goal of this development is not clearly defined and finite, but only vaguely apprehended and perhaps never completely attainable. Our lives are guided

by the feeling of our special limitations and imperfections rather than by a positive knowledge of an absolute good. Progress is made by patient improvement of the finite, by gradual development of our actual powers along lines laid down by past achievement. To this gradual development we can think no end. While it seems impossible to assert the infinity of the self, it seems equally impossible to think ourselves as finite. There is no provision in the moral life for checkage, each advance makes the next more possible and our greatest exertions involve no destruction of tissue or impairment of function comparable to that which takes place in physical life. The starting-point of this development is in the unconsciousness of the natural life, its course is through the effort and struggle by which organization and self-control are won, and its end is in the unconscious certainty and accuracy of formed character. The absence of effort which is the crown of virtue is not a gift of nature but a product of will.

From the point of view of method there can be no question as to the value of this little book as an introduction to ethics. It has the same kind of value for this science as has the work of Professor James for psychology—it gives the student a vivid sense of the real character of the material considered and it has the additional value of clearness and consistency of principle. There is here no clash of opposing systems but a delightfully natural and positive unfolding of theory. Instead of the mass of subtle distinctions between desirés for pleasure and the pleasures of desire by which hedonism is usually overthrown, we have but a paragraph in which the necessity for a criticism of desires is clearly shown. The standard of evolutionary ethics is as simply treated by an indication of the relativity and unfixity of both environment and organism.

Perhaps the most admirable feature of the work is the impressiveness with which the essential character of personality, its unfixity and self-determination, is presented. An appreciation of this is one of the most difficult results to obtain in the average student. They are so accustomed to the idea of objects or of fixed elements and natural law that they find it hard to conceive of a reality which never merely *is* as a completed and given thing, but is always in process of self-determination, for, in spite of the universal currency of the term evolution, the great majority of those who use it mean by it no more than change. Hence the whole significance of the self as more than a product of antecedent forces is lost.

So, too, the consequent impossibility of determining exactly and universally the features of the individual good is brought out naturally and with no suggestion of scepticism. Moral experience is shown as essentially a life, an art, as tentative and experimental, as a construction and testing of ideals. We are made to feel the absurdity of expecting an exact science of that which is contingent, of that which is not yet complete, and there is suggested the fundamental significance of moral faith. In the whole discussion we find just that clearness of distinction between science and life that we should expect from the author of the 'Field of Ethics.'

But a review devoid of criticism is perhaps justly open to suspicion,

and hence a few questionable features might be pointed out in order to set the good in higher relief. These features are possibly due to the necessary limitations of subject and space, but they are none the less serious defects in an introductory study of this character. The first is a consequence of the author's Greek point of view and method of approach. Starting as he does with the nature of goodness, he gives no adequate explicit consideration to the problem of obligation. That the conception of goodness involves that of obligation there is no doubt, but that this implicit element needs to be made explicit is equally true. The good appears to the modern mind as essentially an imperative, and one of the first and most natural questions of the inquirer is as to its authority. Indeed, one might very well insist with Kant that the starting-point for ethics should be the imperative of duty and that the conception of good should be the result of its analysis, but, even if we start from this other aspect, the nature of obligation should be adequately discussed. But, further than this, there seems to be a certain ambiguity in expression concerning the moral motive which might readily be interpreted in a sense directly subversive of the author's position. Is there not a substitution of the observer's point of view, and have we not as it stands a clear description of the essence of immoral action, when the author says, 'Intelligent, purposeful moral conduct is everywhere shaped by the hope of improving the condition of him who acts'? Certainly the self is involved in all rational action, but just as certainly the moral man, save when he is immediately concerned with his own self-culture, does not make the betterment of himself the explicit purpose of his action. He may desire water for the satisfaction of his physical need, but he does not labor for the welfare of the community in order that his self may be enlarged or his powers of self-sacrifice developed. It is because of ambiguities of this rather disastrous character that it seems preferable to substitute for the usual Hegelian formula of self-realization that of the realization of selves.

These minor points, however, due, as they probably are, to limitations of space, can not detract from the essential value of the book as the best introduction we have to the study of morality.

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Binocular Vision and the Problem of Knowledge. JAMES H. HYSLOP. *American Journal of Psychology,* July–October, 1903, pp. 42–59.

This is Dr. Hyslop's contribution to the 'Commemorative Number.' As the title indicates, there is a union here of the writer's speculative and experimental interests. To the reviewer this union seems to have been accomplished with questionable results. But that may be a matter of opinion. The essential question in the writer's mind appears to have been this: Do the phenomena of binocular vision furnish any evidence in support of the claim that the mind transcends its sense-experience? Still more explicitly stated, the question may read: Does the perception of solidity exhibit a case where we "*see* what is not in the 'impression'"?

To the reviewer, the main interest of the article comes from the fact that these two ways of stating the problem are regarded as identical. If 'impression' were used consistently in the Humian sense, no difficulty would be felt. But by 'impression' the writer means here nothing else than the *retinal image*. The question is then, again, whether perception may 'transcend' the retinal image, or, in general terms, 'the states and affections of the sensorium.' Dr. Hyslop reaches an affirmative conclusion for the reason, briefly, that the retinal images have no tri-dimensionality while the object of perception has.

Now, personally, I can not see any force in this line of argument. I know it is customary for those who examine the theory of perceptive knowledge to arrange in order the object, the sense-impression and the conscious state, and then speculate upon the relations subsisting between the members of the series. And there is clearly no harm in doing this, provided one keeps constantly aware of what one is doing. The evil arises, it seems to me, when the assumption is made that the mind somehow operates with the materials that lie in the sense-impression. To maintain that, in the case in hand, perception goes beyond sense-experience, is to imply that the disparate retinal images are somehow the sense material out of which the solid object of perception is created. This seems absurd. The mind might as well make use of the object itself. Indeed, to unsophisticated thought it would seem that, if the mind were to operate with anything in the 'sensorium,' it would be with the ultimate excitations in the cortex rather than with the affections of the sense-organ. Those are 'nearer' to the mind.

To stop at the sense-impression and to examine the likeness or difference between it and the perception is manifestly unfair to the real problem and unfair to the actual fashion in which the psychophysical relations present themselves. In the case in point, then, the question is not whether the retinal image has a solidity which is present in the perceived object, but rather whether the cortical excitation has a solidity, *or any other feature whatever,* which resembles the perceived object. Put in this way the question seems less deceptive, and it becomes clear, I think, that we should seek, not for likenesses, but for correspondences between the mental state and the 'sensorium.' And certainly there is just as much in the cortical excitation to represent solidity as there is to represent two-dimensionality, or color, or size.

But has the real question of knowledge been touched at all by this discussion? To say that perception transcends the visual image, or even the upheaval in the occipital lobes, is as comprehensible as to say that the branches of a tree transcend the wind that blows through them. The question whether perception makes additions to sense-experience—actually conscious sense-experience—has not once been touched upon.

Now, I presume that I have misunderstood Dr. Hyslop altogether. But his appeal to the phenomena of 'upright vision' makes me think that I have not. Here, Dr. Hyslop says, is a distinct case where the percept does not reproduce the relations displayed by the retinal image, but has a form natively its own undetermined by the sense-impression. But

has this really any meaning? Has it not been clear since 1897 that the problem of upright vision is not a visual problem at all?

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Appreciations of Herbert Spencer.

In *The Nation* of December 10, 1903, Professor William James gives an appreciation of Mr. Spencer that is admirable for its justice and breadth of view. His points are briefly these. 'Few are entitled to a higher mark than Mr. Spencer on the score of positive and systematic form,' for 'who, since he wrote, is not vividly able to conceive' of the world evolving from a primitive fire-mist, of life "as a set of ever-changing ways of meeting the 'environment,'" etc.? Again, Mr. Spencer was the prophet of evolution and possessed both the "profundity and the genuine 'spirit of prophecy.'" Further, though he had a "matchless knowledge of certain sets of facts, one may hear it plausibly argued that Spencer is not a 'widely informed' man in the vulgar acceptation of the term." In short, facts that helped his purpose were never forgotten, the others seemed unnoticed.

His 'attitude toward religion is slightly paradoxical.' 'To the ultimate mysteriousness of things,' 'few men have paid more sincere explicit respect.' But this is confined almost to one chapter, and 'then dismissed with an affectionate good-by while all the particular mysteries that later present themselves are quickly explained away.'

Another seeming incoherence is given. In Mr. Spencer's 'heroic defense of individualism against socialism' he seems 'to have started from two independent facts,' to have been 'faithful to two ideals'—'the old English ideal of individual liberty' and 'the theory of universal evolution,' where 'the fate of the individual fact (or unit) is swallowed up in that of the aggregate whole.' But ought we not to add to the statement of Professor James, that here in Spencer's social theory a deeper conflict of principles comes to the surface? It is the old story, the mechanical-atomic cosmology and its opponent, the dynamic. In the former, the unit is the sport of external forces; in the latter, the monad determines its own life uninfluenced from without. This is the problem whose solution must determine the fate of Spencer's theory of evolution. If atomism be true or be, at least, an essential part in truth's ultimate synthesis, then his theory may remain secure. If the dynamic cosmology be the whole truth, then his theory is impossible. But if the final synthesis reconciles, as we believe it will, the mechanical and the dynamic theories, then the contradiction found here in Spencer's social teaching as well as the profounder opposition offered to his doctrine of evolution may both be removed.

Finally Professor James tells us that the 'ethical and political part of Mr. Spencer's writings seems the most impressive and likely to endure,' and that the 'Principles of Biology, of Psychology, and of Sociology' (though the last 'has probably a longer lease of life') will not remain as well known to the reading world as the 'First Principles.' But all this

is as it should be, not 'his infallibility in details,' but 'the bravery of his attempt' to seek truth as a whole, 'the original Greek ideal of philosophy,' and his life devoted to the service of mankind and true to its ideal, these are the things by which Spencer can afford to be judged.

The appreciation of Mr. Spencer by Professor Franklin H. Giddings, in *The Independent* for December 17, 1903, is especially welcome, because it comes from one who owes so much himself to Spencer's work and to his power of inspiring. Professor Giddings tells us that 'when all destructive criticisms have been made, this astonishing fact remains, that it is impossible to-day for the specialist in physics, in biology, in psychology, in sociology, or in ethics to offer any new hypothesis or constructive doctrine without directly or indirectly defining its relation to the philosophy of Herbert Spencer. It is this fact that justifies the comparison of Spencer to Aristotle. For in the whole history of human thought, these two men alone have so presented and interpreted the knowledge of their time that all other thinkers must of necessity take a position of antagonism to these masters or of agreement with them.' But we should be disposed to amend this statement of Professor Giddings, at least in part. Is not Spencer's contribution to metaphysics too limited and has not his theory of evolution rigidly confined his other contributions within too narrow limits to bring him in contact with all the chief thoughts of his time? We believe that there are even broad doctrines, it is surely true in philosophy, in discussing which Spencer's name need not be mentioned.

Our critic proceeds justly to show how preeminently original Spencer was when judged by the advance his doctrines made over positions actually held at the time of their formulation. But so short is human memory and so marvelous was Mr. Spencer's constructive power and gift of intelligent exposition 'that since 1880 all men have imagined that mankind has always thought in terms of evolution, forgetting to whom they owe their enlightenment.'

The most unfair criticism of Mr. Spencer is the assertion that specialists regard him as a great contributor in every other science than their own. As for sociology, Professor Giddings, 'expressing his own individual opinion,' does not hesitate to say that 'Mr. Spencer should be regarded as the true founder of scientific sociology, and as its greatest constructive thinker.' Of the many reasons for this judgment our critic gives three: (1) Spencer saw that 'the evolutionary process in society, as in plant and animal life, takes the form of a continuing adaptation of organism to environment, and that in human history the essential phase of the adaptation is a molding of human character to the relatively permanent circumstances of collective life.' A second reason 'is found in the insight with which he detected the dominant causes of social character.' The third reason, often cited as an incoherence, is Spencer's extreme individualism. 'Throughout his system he distinguishes between simple and compound evolution.' 'In the latter evolution is hindered and is complicated by differentiation.' The highest types of individual life are not possible where all else is sacrificed to integration, but only where there is a sufficient integration 'to insure cooperation

leaving the utmost freedom' for individual personal development. But does Professor Giddings remove all the difficulty of the adverse critic? It may be that he does as far as sociology's problem of the individual is concerned, but not so when we come to the ethical and metaphysical problem, to which sooner or later we must come.

Mr. Hudson gives a brief, good and authoritative sketch of Mr. Spencer's life and character in the same issue of *The Independent*, almost all of which, of course, may be found more fully stated in his book 'Introduction to the Philosophy of Herbert Spencer.'

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JOURNALS AND NEW BOOKS.

AMERICAN JOURNAL OF PSYCHOLOGY. July–October, 1903. Vol. XIV., No. 3–4. Commemorative Number, dedicated to President G. Stanley Hall by colleagues and pupils on the twenty-fifth anniversary of his doctorate. *Contribution à la psychologie du rêve (pp. 7–23)*: H. BEAUNIS. – Results of a life-long study of the author's own dreams: content and causation of his dreams; changes with age. *Deception and Reality (pp. 24–41)*: A. KIRSCHMANN. – All data of consciousness are real; unreality results from interpretation and depends on a willingness to lie. *Binocular Vision and the Problem of Knowledge (pp. 42–59)*: J. H. HYSLOP. – The perception of depth in binocular vision is native, and yet transcends the actual data of the retinal images. *A Critique of 'Fusion' (pp. 60–72)*: I. M. BENTLEY. – Fusion depends partly on the purely sensory interrelationship of elements and partly on the unifying effect of attention. *The Genetic Function of Movement and Organic Sensations for Social Consciousness (pp. 73–78)*: M. F. WASHBURN. – Social consciousness arises from social instincts, by the development of 'free ideas.' Ejected ideas are distinguished from memorial by the presence of different instinctive movements. *The Status of the Subconscious (pp. 79–89)*: J. JASTROW. – There is abundant evidence of the existence of subconscious processes, but not of their organization into a separate personality, nor of any impassible barrier between them and consciousness. *An attempt at Analysis of the Neurotic Constitution (pp. 90–103)*: A. MEYER. – A plea for more careful study of types of the mentally unstable, in place of simply calling them all 'degenerates.' Several types are described. *The Psychology of Football (pp. 104–117)*: G. T. W. PATRICK. – The great interest in games of football can only be explained on anthropological grounds, viz., as an instance of the pleasure in returning to primitive conditions of life. *Retroactive Amnesia: Illustrative Cases and a Tentative Explanation (pp. 118–132)*: W. H. BURNHAM. – A blow on the head may abolish memory of events just before the shock, perhaps because time is necessary to ingrain an experience in the brain, and this ingraining process is checked by the shock. *The State of Death: an Instance of*

Internal Adaptation (pp. 133–145): J. H. LEUBA. – The mystical state of death to the world and to desire can not result from adaptation to external conditions. *Primitive Taste-Words (pp. 146–153):* A. F. CHAMBERLAIN. – A study of the taste-words of Algonkian peoples. *On Time Judgment (pp. 154–174):* B. EDGELL. – Short filled periods of time are overestimated, longer ones under-estimated. The interpolation method shows Weber's law not to hold. This invalidates Ebbinghaus's revised basis for Fechner's law. *Class Experiments and Demonstration Apparatus (pp. 175–191):* E. B. TITCHENER. – Lecture demonstrations on the senses. *Experimental Studies in the Psychology of Music (pp. 192–214):* M. MEYER. – (1) To end satisfactorily, a melody may either descend or come to a 'tonic.' (2) Large ascending intervals are preferred slightly enlarged; but the minor third and second are preferred diminished. (3) Quartertone music constructed according to the general laws of European music becomes pleasing on familiarity; all music has the same fundamental laws. *Ein Beitrag zur experimentellen Aesthetik (pp. 215–231):* O. KUELPE. – Comparative introspective study of the factors in esthetic appreciation. Significance, congruity, recognition, association were prominent factors. Lipps's 'sympathy' was not noted. *A Study of the Accuracy of the Present Methods of Testing Fatigue (pp. 232–245):* A. C. ELLIS AND M. M. SHIPE. – Various tests commonly used for mental fatigue were found to disagree in their results, and on the whole to show no fatigue during a day's work. Therefore, they are unreliable; no adequate test of mental fatigue has been found. *A New Type of Ergograph, with Discussion of Ergographic Experimentation (pp. 246–276):* J. A. BERGSTRÖM. – An instrument capable of use with several separate muscles, with weight or strong or weak spring. *Attention Waves as a Means of Studying Fatigue (pp. 277–288):* W. B. PILLSBURY. – Diurnal variations in the attention wave. Some subjects show increased and some decreased efficiency towards evening. *Studies in Pitch Discrimination (pp. 289–309):* G. M. WHIPPLE. – A subject having memory for absolute pitch had no exceptional discrimination for pitch. A very unmusical person was not definitely subnormal in pitch discrimination under the simplest conditions. The pitch of a chord can not be remembered as well as that of a clang or a melody. *Statistics of American Psychologists (pp. 310–328):* J. MCK. CATTELL. – The psychologists were ranked independently by ten competent judges; the average results with probable error are given. The accuracy of this sort of judgment is studied. Academic origin of the psychologists. *A Study of the Conductivity of the Nervous System (pp. 329–350):* Y. MOTORA. – Several nervous phenomena can be imitated by a water wave in an elastic tube; suggestion that the 'nerve impulse' may be such a wave. *The Relation of Motor Power to Intelligence (pp. 351–367):* T. L. BOLTON. – Eight- and nine-year-old children of the well-to-do are superior in motor speed and steadiness to poor children of the same age, and gain more from eight to nine. *Are Chromæsthesias Variable? (pp. 368–382):* F. B. DRESSLAR. – Tests of one subject showed, during eight years, few changes in color associations with names and letters. *On the Guessing of Numbers (pp. 383–401):* E. C. SAN-

FORD. – Number preferences as shown in a guessing contest; such preferences vary with conditions. *A Quarter Century of Psychology in America: 1878–1903 (pp. 402–416):* E. F. BUCHNER. – Outlines the transformation of American psychology that began twenty-five years ago, and the changes since. *Bibliography of the Published Writings of President G. Stanley Hall, 196 titles (pp. 417–430):* L. N. WILSON.

Cohen, Hermann. *System der Philosophie. Erster Theil: Logik der Reinen Erkenntnis.* Berlin: Bruno Cassier. 1903. xviii + 520 p. Lexikon Format. 15.50 m.

Groos, Dr. Karl. *Das Seelenleben des Kindes.* Berlin: Reuther & Reichard. 1904. 229 p. 8vo. 3 m.

King, Irving. *The Psychology of Child Development: with an Introduction by J. Dewey.* Chicago: University of Chicago Press. 1903. xxi + 265 p. 12mo. $1.00.

Natorp, Paul. *Sozialpädogogik. Zweite vermehrte Auflage.* Stuttgart: Fr. Fromanns Verlag. 1904. xxii + 400 p. 8vo. 6.80 m.

Rabier, Elie. *Leçons de philosophie.* I. *Psychologie. Avec un appendice sur le Rôle de la Philosophie dans l'Education. Septième Edition.* Paris: Hachette et Cie. 1903. 686 p. 8vo. 8.50 fr.

Sabatier, Auguste. *Les Religions d'authorité et la religion de l'esprit.* Paris: Libraire Fischbacker. 1904. xii + 570 p. 8vo. 7.50 fr.

Stern, Paul. *Grundprobleme der Philosophie.* I. *Das Problem der Gegebenheit.* Berlin: Bruno Cassier. 1903. viii + 79 p. 8vo. 1.60 m.

Stout, G. F. *The Groundwork of Psychology.* New York: Hinds & Noble. 1903. vii + 248 p. 12mo. $1.25.

Uphues, Dr. Goswin. *Zur Krisis in der Logik. Eine Auseinandersetzung mit Dr. Melchoir Palágyi.* Berlin: C. A. Schwetschke & Sohn. 1903. 8vo. 117 p. 2.80 m.

Weber, Dr. Heinrich. *Hamann und Kant. Ein Beitrag zur Geschichte der Philosophie.* München: C. H. Beck'sche Verlagsbuchhandlung. 1904. x + 238 p. 8vo. 4 m.

Wullach, Hans. *Die Neue Logik.* Berlin: S. Calvary & Co. 1904. 117 p. 8vo. 1.50 m.

NOTES AND NEWS.

THE members of the American Philosophical Association, by its officers, desire to call the attention of all teachers of philosophy to the fact that next February 12th is the centenary of the death of Immanuel Kant. They respectfully suggest that such memorial notice should be taken of this fact as in each case seems practicable. It is hoped that a more formal celebration of the illustrious services of this great thinker may be arranged for at the next meeting of the association.

GEORGE TRUMBULL LADD, *President.*
H. NORMAN GARDINER, *Secretary.*

PROFESSOR VAIHINGER has issued a call to the friends of the Kantian philosophy to join in the formation of a 'Kantgesellschaft' and the establishment of a 'Kantstiftung' in commemoration of the centenary of the death of the philosopher. It is proposed in this way to make good the deficit of from 500 to 600 marks, which has confronted the editors of the Kantstudien during recent years. Subscriptions may be sent to the American editor, Professor J. E. Creighton, Cornell University, Ithaca, N. Y.

MR. SHYAMAJI KRISHNAVARMA has offered to endow with £1,000 a lectureship at Oxford University in honor of Herbert Spencer, similar to the Romanes lectureship.

THE Munich Academy of Sciences has received a bequest from the late A. Samson, amounting to about $125,000, to encourage the scientific study of ethics.

MR. KARL PEARSON, F.R.S., professor of applied mathematics, University College, London, known to students of philosophy by his 'Grammar of Science' and the application of exact methods to biological problems, has been elected an honorary fellow of King's College, Cambridge.

AT Oxford University Mr. Thomas Case, Wayneflete professor of moral philosophy and metaphysics, has been elected an honorary fellow of Corpus Christi College; and Mr. Reinhold F. A. Hoernlé, B.A., Baliol College, has been elected to the John Locke scholarship in mental philosophy.

PROFESSOR DAVID IRONS, associate professor of philosophy, who has been absent during this semester on account of illness, will return to Bryn Mawr for the second semester and resume his lectures, which have been given during his absence by Dr. George S. Painter.

DR. EDWARD L. THORNDIKE has been promoted from an adjunct professorship to a professorship of educational psychology at Teachers College, Columbia University.

J. H. BAIR, PH.D., now research assistant for the Carnegie Institution working in the psychological laboratory, Columbia University, has been appointed professor of psychology and education in the University of Colorado.

MR. T. W. ARNOLD, professor of philosophy in the Government College, Lahore, and dean of the Faculty of Oriental Studies of the Punjab University, has been selected for the post of assistant librarian at the India Office.